

immediately below the crown of anal papillæ, there is also a calcareous ring composed of ten pieces, of very regular form; and the five radiate muscles of the intestine are attached to the five radial pieces. The calcareous ring of the pharynx is placed a little deeper in the peduncle than that of the intestine; therefore a section of the peduncle at the level of the root of the buccal tentacles shows plainly the five radial muscles of the intestine, but not those of the pharynx. The small dimensions of the object have not, unfortunately, allowed it to be ascertained how the aquiferous vessels of the rays behave in the neighbourhood of the calcareous rings. The existence of a double calcareous ring and the division of the rays into five intestinal and five pharyngeal rays might lead us to suppose that there exist two circular vessels. If, however, we admit, despite this arrangement, a single nervous ring and a single circular aquiferous vessel, it is still no less impossible to refer this singular animal to the typical form of the *Holothuriæ*, notwithstanding the incontestable affinities that have been indicated in the internal organs. We might, it is true, suppose the *Rhopalodina* to have resulted from a *Psolus* or *Colochirus* whose buccal and anal cones had been much elongated and soldered to one another; but although that transformation might produce a form analogous to *Rhopalodina*, the rays could not be arranged as in these animals. The two dorsal rays should, on the contrary, disappear entirely, and we ought to find on the peduncle two groups of three rays becoming continued one into the other at the extremity of the abdomen.

In all living Echinoderms the anus is placed either opposite to the mouth in the centre of the radiate arrangement or in an inter-radium. In some fossil Crinoids alone (the *Crinoidea tessellata*) there exist more than five rays placed round a single central aperture. These are in reality the only Echinoderms in which we could suppose an arrangement of the pharynx and intestine in relation to the rays like that which M. Semper has described in *Rhopalodina*. Yet these latter could not be united with the Crinoids, because of the totally different structure of their ambulacra, leaving out of consideration that their internal organs approximate them much more to the *Holothuriæ*.

The author does not see any other way of getting out of the difficulty than to create for these singular animals a new class, under the name of *Echinodermes diplostomes*. He promises us a detailed description of the genus *Rhopalodina* in a supplement to his great work on the *Holothuriæ*.—*Verhandl. phys.-med. Gesellsch. in Würzburg*, June 6, 1868: *Bibl. Univ.* August 15, 1868, *Bull. Sci.* pp. 326–328.

Coccoliths and Cocospheres. By G. C. WALLICH.

September 7, 1868.

In a lecture "On a Piece of Chalk," delivered by Prof. Huxley to working men during the recent meeting of the British Association, and published with the author's initials in the September number of *Ann. & Mag. N. Hist.* Ser. 4. Vol. ii. 22

'Macmillan's Magazine,' attention is directed to certain minute bodies to which he gave the name of "coccoliths," as met with in soundings obtained in 1857 by Capt. Dagman in H.M.S. 'Cyclops.' Speaking of these bodies, the author says, "Dr. Wallich verified my observation and added the interesting discovery that not unfrequently bodies similar to these coccoliths were aggregated together into spheroids, which he termed coccospheres." He goes on to say that "A few years ago Mr. Sorby, in making a careful examination of the chalk, by means of sections and otherwise, observed, as Ehrenberg had done before him, that much of the granular basis possesses a definite form. Comparing these formed particles with those in the Atlantic soundings *he* found the two to be identical, and thus proved that the chalk, like the soundings, contains these mysterious coccoliths and coccospheres."

In the above extract I will, with your permission, point out one or two inaccuracies, no doubt unintentional on Prof. Huxley's part, but of sufficient importance to induce me to beg you will afford me the opportunity of correcting them, and at the same time of drawing the attention of naturalists to some additional facts connected with the bodies in question.

The occurrence of the spheroidal objects to which I assigned the name of coccospheres, as being most intimately connected with the coccoliths of Prof. Huxley, was detected by me in North Atlantic soundings, whilst on the surveying cruise of H.M.S. 'Bulldog,' in July 1860, a general notice of their existence having appeared in my 'Notes on the Presence of Animal Life at great Depths in the Sea' in November of the same year, and a detailed description, with figures and measurements, having been published by me in the *Ann. & Mag. Nat. Hist.* in July 1861. The identification of the coccoliths of the soundings with those of the chalk (to the last of which attention was drawn by Ehrenberg and Mr. Sorby) was announced for the first time in the two papers just referred to, Mr. Sorby's paper having appeared in the 'Annals' in September 1861. In this paper Mr. Sorby actually refers to the spheroidal bodies under the name I gave them. The merit of the identification spoken of by Prof. Huxley, such as it is, I have therefore a right to claim as mine.

The coccoliths, however, cannot correctly be said to be "aggregated together into the spheroids," as stated in the lecture. They are in reality arranged, at intervals, over the surface of the spheroidal cell, on which their concave surfaces rest, and which is, to this extent, a separate portion of the structure. When detached, as they invariably appear to be in the chalk and the fossil earths (of which I shall have occasion to say a word presently), they bear the same relation to the supporting cell that the fallen fruit bears to the tree that bore it, and nothing more.

Of their true position in the organic world I am ignorant. But I have these important facts to add (referred to by me incidentally in a paper on "The Polycystina," which was read before the Royal Microscopical Society in May 1865, and published in the *Transac-*

tions of that Society), that I have detected coccoliths in abundance, and retaining their normal characters, in some of the fossil siliceous earths of Barbadoes &c., and that coccospheres have been met with by me profusely in a living, or perhaps it would be more safe to say, a recent condition, in material collected at the surface of the open seas of the tropics, and also in dredgings from shoal water obtained off the south coast of England.

It only remains for me to add that, so far as the chemical nature of these bodies can be ascertained by reagents and the polariscope, there is reason to believe that carbonate of lime enters largely into their composition; and they furnish us with another striking example, in which simplicity of structure has enabled an organism to weather the vicissitudes to which the surface of the globe has been subject, and under the operation of which more complex forms have ceased to exist.—*Athenæum* for Sept. 19, 1868.

Transporting Fish alive.

Mr. Moore, the Curator of the Liverpool Free Museum, has succeeded in importing some living fish from the River Plate, the first live fish that he has received from the south of the equator. Some English fish sent out by the same captain arrived safely; and he left Liverpool on the 11th of this month with another series of fish. They were sent out and imported in a common fish-globe suspended like a cabin-lamp, in gimbals.

There are now exhibited in the Liverpool Museum two catfish, three pomotis, two species of *Cyprinus*, four axolotls, and a *Proteus* that were imported from New York by the same method.—J. E. GRAY.

On Tetilla euplocamos and Hyalonema boreale.

By Dr. J. E. GRAY, F.R.S. &c.

It is a curious coincidence that three small-peduncled capitate sponges should be discovered about the same time, viz. :—

1. *Hyalonema boreale*, Lovén, from the North Sea.
2. *Lovenia boreale* of Bocage, coast of Portugal.
3. *Tetilla euplocamos*, Oscar Schmidt, Spongien von Algier, t. 5. f. 10, from Brazil.

There can be no doubt that they are all distinct species; and the spicules show that the North-Sea and Portuguese species must be referred, according to my views, to different families—the one to Halichondriadae and the other to Tethyadae. Unfortunately *Tetilla* is not regularly described by Dr. Oscar Schmidt.

It is curious that Dr. O. Schmidt, like Dr. Lovén and M. Bocage, compares the small-peduncled sponge to *Hyalonema*. The *Tetilla* was sent to him from Brazil by M. F. Müller. He observes, "The pear-shaped body is like *Tethya*," and the peduncle is like *Hyalonema*; the body is formed of clustered spicules with abundance of thrice-forked spicules, the forks projecting, and covering the surface